

November, 1985

PAARA

GRAPHS

Featuring:

The 1985 financial
Auction at Ampex
on the Christmas
article reprinted
Tribune relating
amateur radio in



report from the
The information
dinner. Also an
from the Times
information on
the Mexican quake.

**THE OFFICIAL NEWSLETTER
OF THE PALO ALTO AMATEUR
RADIO ASSOCIATION
AND
THE MENLO PARK C.D. AMATEUR RADIO CLUB**

**PARRAGRAPHS is the official newsletter of the
Palo Alto Amateur Radio Association &
the Menlo Park Civil Defense Radio Club.**

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Membership in PAARA is \$6.00 per calender year which includes a subscription to Paaragraphs. Make payment to :PAARA, P.O. Box 911, Menlo Park, Ca. 94026

Club Net 147.45 MHZ Monday @ 8:30 PM

This Month's Speaker is:

Ted Harris
N6IIU

AMATEUR PARTICIPATION IN THE MEXICAN EARTHQUAKE

Ted and other amateur radio operators were dispatched to Mexico City to provide communications for the Red Cross and ensure reliable radio links between Mexico City and the outside world.

Next Month's feature speaker will be:

Ken Manders

ANTENNAS ANTENNAS ANTENNAS

Ken will discuss antenna construction, alteration, and design!

Switcher Operation

Last month some of you may have noticed a curious situation regarding the impedance levels in our switcher example. The input was 400 ohms (200 V at .5 amp) while the output was 100 ohms (100 V at 1 amp), or a ratio of 4:1. We can also observe that the duty ratio in this example was .5, and that

$$\frac{100}{400} = (.5)^2$$

Is it possible that the duty has similar properties to a transformer turns ratio, where the impedance is translated by the square of the turns ratio? A corollary to this is that the output in our example has a definite and linear relationship to the duty cycle which is:

$$\text{duty} = \frac{V_{\text{out}}}{V_{\text{in}}}$$

Our example fits this relationship where:

$$.5 = \frac{100 \text{ V}}{200 \text{ V}}$$

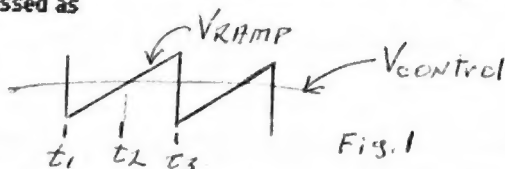
This particular organization, or topology, of switch, diode and storage elements is known as a buck regulator. There are at least two other basic forms (which have non-linear properties related to duty), and numerous forms based on complex combinations. However, to minimize confusion we will stick for the moment to the buck regulator. In order to perform its function the switch must be controlled with respect to its on and off time. We shall define duty a little more rigorously now as

$$D = \frac{T_{\text{on}}}{T_{\text{on}} + T_{\text{off}}}$$

This ratio is controlled in most buck regulators by electronically comparing a control voltage to a reference ramp signal as in fig 1.

The control signal exceeds the ramp at t_1 and the switch turns on. At t_2 the ramp exceeds the control voltage and the switch turns off. The process is repeated starting at t_3 . For fix frequency regulators which is typical, the duty can now be expressed as

$$D = \frac{T_{on}}{\text{Period}}$$



One of the best ways to begin trouble shooting a recalcitrant switcher is to break the "feedback loop" and inject the control voltage from an external source. By monitoring the control and ramp voltages on an oscilloscope, we can see if the main switch is following the proper commands. More on this next month when we look at the "Feedback Loop."

/WAGLNV

PRB-1 The text of the recent FCC ruling (PRB-1) is available from the editor for inspection. I was not able to include a listing of PRB-1 in PAARA-Graphs since it runs for seven pages.

CHRISTMAS DINNER DEC 16, 1985

In spite of the fact that Ricks Swiss Chalet has been carried off to the local dump, there will be a Christmas Dinner. It will be across the street at the "Liaison" restaurant. It is located at 4101 El Camino Way in Palo Alto. We will have a gift exchange (hold it to \$2-\$3). Sign up at the November meeting or on Monday Night net.

The pertinent facts are:

6:00 PM No Host cocktails

7:30 PM Dinner

Brochette of Beef or Chicken Kiev

Soup or Salad

Coffee

Total Price: \$15.00

REPEATER BAND PLANS: 15 or 20 KHz Part 2

by W5APZ

Last month I discussed the need for Amateur Radio equipment that had an IF pass band with a sharp roll off on both sides providing 60 db rejection to an adjacent channel 12.5 KHz away. When added to strategic geographic placement of repeaters on adjacent channels and high third-order-intercept front ends, repeater placement on 15 KHz or even less would not be a problem. The technology exists. I believe we need to make our needs known to the suppliers of Amateur Radio equipment.

This month, I shall discuss several long-range ideas to get state-of-the-art equipment that will maximize the number of repeaters we can place in a given spectrum width.

I believe that manufactures will be motivated to produce the radios we want if they are guaranteed a market for those radios. The market will exist if:

- o state-of-the-art technical standards are implemented
- o there is a new phased-in national band plan using these standards
- o new ICs were to exist to facilitate the production of inexpensive state-of-the-art equipment.

Let's look at each one of these in more detail.

State-Of-The-Art Technical Standards

These standards could provide for both narrow-band FM, (12.5 or 15 KHz spacing with sharp roll-off IFs and high third order intercept front ends) and Amplitude Compandered Single Sideband (ACSB). ACSB articles have appeared in the literature. These articles have shown that ACSB takes up less bandwidth than SSB and is several DB better in signal-to-noise ratio for weak signal conditions. Why couldn't hams build ACSB repeaters for use with ACSB HTs? The normal SSB signal is 2.5 KHz wide. ACSB is even narrower. Assuming that we could space ACSB repeaters on 5 KHz spacing, we could have three times the present number of repeaters in operation than we have in the 15 KHz band section of the present repeater band and four times the present number in the 20 KHz portion of the repeater band. Since a carrier is not being transmitted continuously with ACSB, battery life would increase. This is important in hand-held units.

National Band Plan

A national band plan passed by the FCC with the guidance and cooperation of the ARRL might take the form of:

- o voluntary compliance for years one through three
- o one third of each repeater band must comply in year three
- o the second third of each repeater band complies in year six
- o the last third of each repeater band complies in year nine.

This would allow us to phase out current equipment while still getting full value from our investments. The voluntary compliance period would allow time to design and market the new gear. Upgrade kits might be made available or articles in local ham magazines might describe how to modify your existing rig. With a planned national market, manufacturers would have the incentive to produce the equipment.

New ICs

Many hams in Silicon Valley work for IC manufacturers. Custom ICs could be designed to make ACSB easily packaged in a hand-held unit. The availability of such ICs at quantity OEM prices would encourage manufacturers, and subsequently as prices came down, do-it-yourself projects for the new equipment.

Repeater Coordination Standards

State-of-the-art technical standards need to be established for repeater coordination. Using these standards, we will be able to accommodate more repeaters, whatever the mode, in the same spectrum space with less interference. This means using computer programs for:

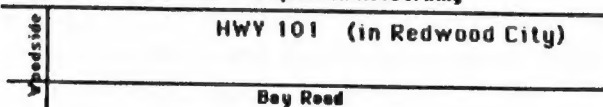
- intermodulation product calculation and minimization
- minimum line of sight distances between repeaters considering significant factors as EIRP, terrain, and elevation of repeaters, etc.
- maintaining a current data base of significant repeater information
- establishing a computer-based standard coordinating procedure which takes into account existing cochannel users in all directions as well as adjacent channel users' needs. This procedure could be integrated with a PERT or scheduling-type chart to expedite coordination approvals.

We have a great deal of professional technical expertise in the amateur radio community. Many of us are electrical engineers, computer designers, software engineers, etc. Together we can make it happen.

Rich Stiebel, W6APZ

Packet Radio meeting @ Ampex Cafeteria, Tues Nov 5 @ 7:30PM

George Flammer VB6RAL will speak on Networking



News and Notes

The auction has come and gone, and with it, our last chance at the great deals of the year. I had wanted to recognize all those who helped out at the auction, either by their efforts there, or by their donations to the PAARA flea market table. I fear that some of those who have helped or donated to the cause have been missed, but here is the list:

W6APZ	W6ISQ	WB6QPV
W6ARA	W6LII	KA6RMA
N6CHI	WA6LNV	K6SEM
N6CHL	KA6LZI	W6VG
K6EHS	W6NIR	K6YT
VE3FZK	WA6NYB	KD6ZL

The nominating committee is busy with the nominations of new officers for next year. If you have any suggestions, please contact Gerry, WA6LNV, with those suggestions. I am certain that he will appreciate it.

Christmas Party

The Christmas party is coming on December 16. Since Rick's Swiss Chalet is no longer there, the Christmas party will be held at the Liaison restaurant. The new location should be easy to find, as it is practically next door to where Rick's Swiss Chalet was! Those wishing to attend should get their reservations and dollars in to Gerry, WA6LNV, at the November meeting. If you cannot make it to the meeting, and want to go to the party, you should give Gerry a call as soon as possible.

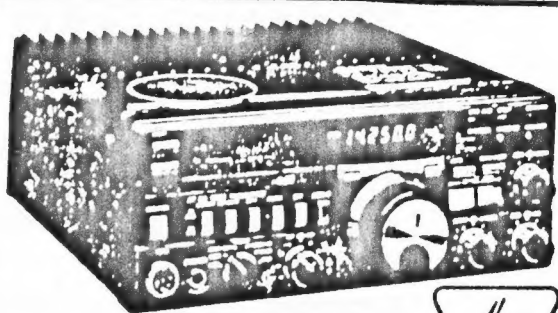
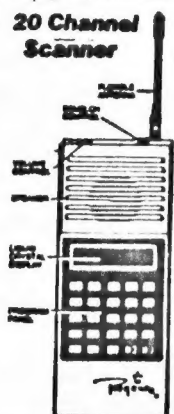


Quement has all of Your Communication Needs for Business or Home

Keyboard Programmable Regency 20 Channel HX2000

FEATURES:

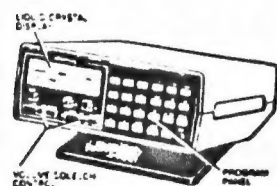
Keyboard Programmable For the ultimate in versatility.
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**** PAARA AUCTION 85 ****

The PAARA Auction is edited into history as '85 rolls into the final quarter. A quick tally on registrants, lots, tables, and bucks adds up to another good showing.

	<u>1985</u>	<u>1984</u>
Registrants	351	310
Lots 57	\$1,167.00	1,347.50 (73)
Fl-Mkt 56	427.00	439.50 (41)
Food	214.45	170.05
Raffle	99.00	90.00
Gr. Receipts	1,907.45	2,047.05
Paid (90%)	732.60	1,144.30
Expenses	166.52	149.40
Net	1,008.33	753.35

The 1985 net shows a \$255 increases over last year. This gain is due primarily to generous donations of equipment by various members. The overall success is worthy of note and a tribute to the continuing efforts of the Auction Volunteers.

JmcE/Treas.

The Minutes for the Oktober meeting

Ron Olney, KL7JDX, gave an interesting presentation concerning cellular telephone communications. He not only discussed the present commercial applications, but the future technological influence of cellular communications on the amateur radio service: specifically the recently allocated 900 MHz band.

Information contributed by VE3FZK, Andy Korsak (Vice President) and assimilated by KB6BPM, Kenneth S. Dueker (Associate Editor).

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